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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE RIO GRANDE DISTRICT
REGION EIGHT - RIO GRANDE SURVEY

REPORT ON SURVEYS, EXAMINATIONS, AND INVESTIGATIONS MADE NEAR SAN MARCIAL, NEW MEXICO DURING 1936, 1937, and 1938

By

HERBERT W. YEO

Associate Agricultural Engineer

APPROVED:

Regional Conservator — Date June 28, 1939

For Surveys & Project Planning — Date June 26, 1939

Mr. Smith

Mr. Smith

Albuquerque, New Mexico
June 21, 1939

MEMORANDUM TO: Mr. E. R. Smith

From: Mr. Arthur Fife

Subject: Siltation Conditions in and near San Marcial, New Mexico, - 1936-38

JUL 17 1939

You will find herein Mr. Yeo's report covering siltation conditions in and near San Marcial, New Mexico, 1936-1938.

This report represents the accumulation of factual data together with many photographs dealing with the unusual damage from siltation which was especially pronounced during the year 1937. It, in reality, is a progress report and I think it is quite desirable to approve it for distribution as soon as possible. Apparently there is quite a demand for this report.

Arthur Fife

ARTHUR FIFE
In Charge, Flood Control Surveys

AF/mt
Attachments

AT/ca

TABLE OF CONTENTS

Albuquerque, New Mexico
January 16, 1939

MEMORANDUM

From: Herbert W. Yoe, Assoc. Agr. Eng.

To: J. W. Jourdan, Chief Engineer

Subject: Report on Conditions in and near San Marcial, New Mexico, 1936, 1937 and 1938.

Herewith please find report as mentioned above.

Herbert W. Yeo

Herbert W. Yeo,
Assoc. Agr. Engineer

General Statement

This report is largely a compilation of data of various kinds which pertain, in the main, to an area near San Marcial, New Mexico. Some associated data are presented, the most prominent being related to the stream bed at San Marcial and to certain features and conditions of the Elephant Butte Reservoir.

Most of the data pertain to the great floods and high water which prevailed from April 13 to June, 1937.

As a result of these floods two avulsions occurred. One ran through a pilot channel in the Tiffany Marsh on the right side of the river, and the other of numerous small channels which converge near Val Verde. A lake formed down the valley from Val Verde and thousands of acre feet of silt have been deposited therein.

One of the most prominent results of the floods of 1937 was the extreme degradation of the channel of the river from the San Marcial-Val Verde Highway bridge down stream for a considerable, but unknown, distance below the bridge of the A. T. & S. F. Ry. This degradation has continued into 1939, but the rate has been less. These data, as well as a great amount of data related to the very extensive and precise data secured in 1936, have not been compiled and correlated with other data made available by the U. S. Bureau of Reclamation prior to 1936.

During 1936 certain valley cross sections previously established by the U. S. Bureau of Reclamation were reprofiled and certain additional valley cross sections were located and profiled. Considerable data and a considerable number of photographs found herein pertain to these valley cross section lines.

As the report is largely an assemblage of factual data, the arrangement is not entirely satisfactory as they were secured at different times and cover various subjects. A chronological arrangement has been used in the main.

No attempt has been made to correlate the conditions prevailing about San Marcial with the effects of Elephant Butte Reservoir as basic data have not been prepared in proper form for study or presentation.

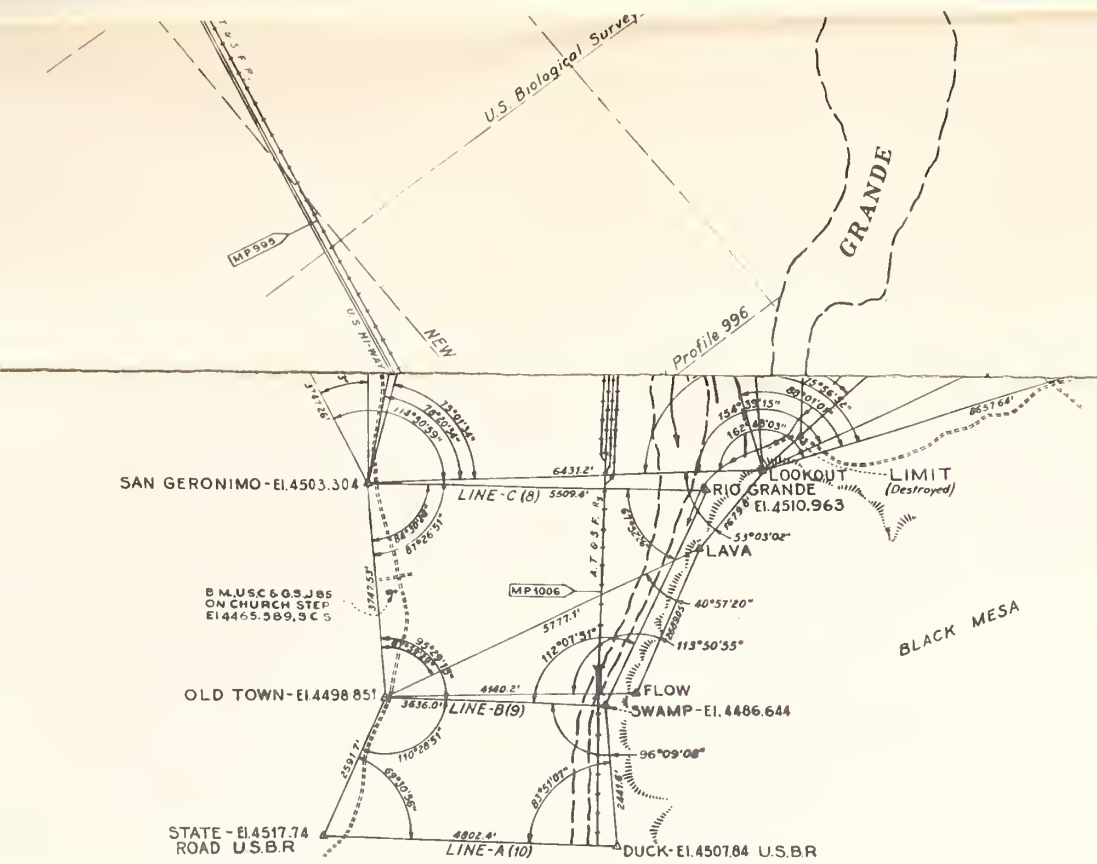
The only departure from the factual data is a statement of the conditions which probably caused the formation of the natural dam in the Rio Grande about one and three-fourth miles below Point of Land and between Lines I and J. This deposition is shown in a profile entitled Stream Bed and Water Surface Profiles of the Rio Grande in the Vicinity of San Marcial, January, 1936 and December, 1937.

The data here presented are intended to be a permanent compilation for additional reports.

KEY MAP

OF

SAN MARCIAL AND VICINITY



UNITED STATES
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SOIL CONSERVATION SERVICE
RIO GRANDE DISTRICT
RIO GRANDE SURVEY

KEY MAP
OF
SAN MARCIAL & VICINITY

U.S. Bureau of Reclamation &
Hydrodynamics Section Cooperating

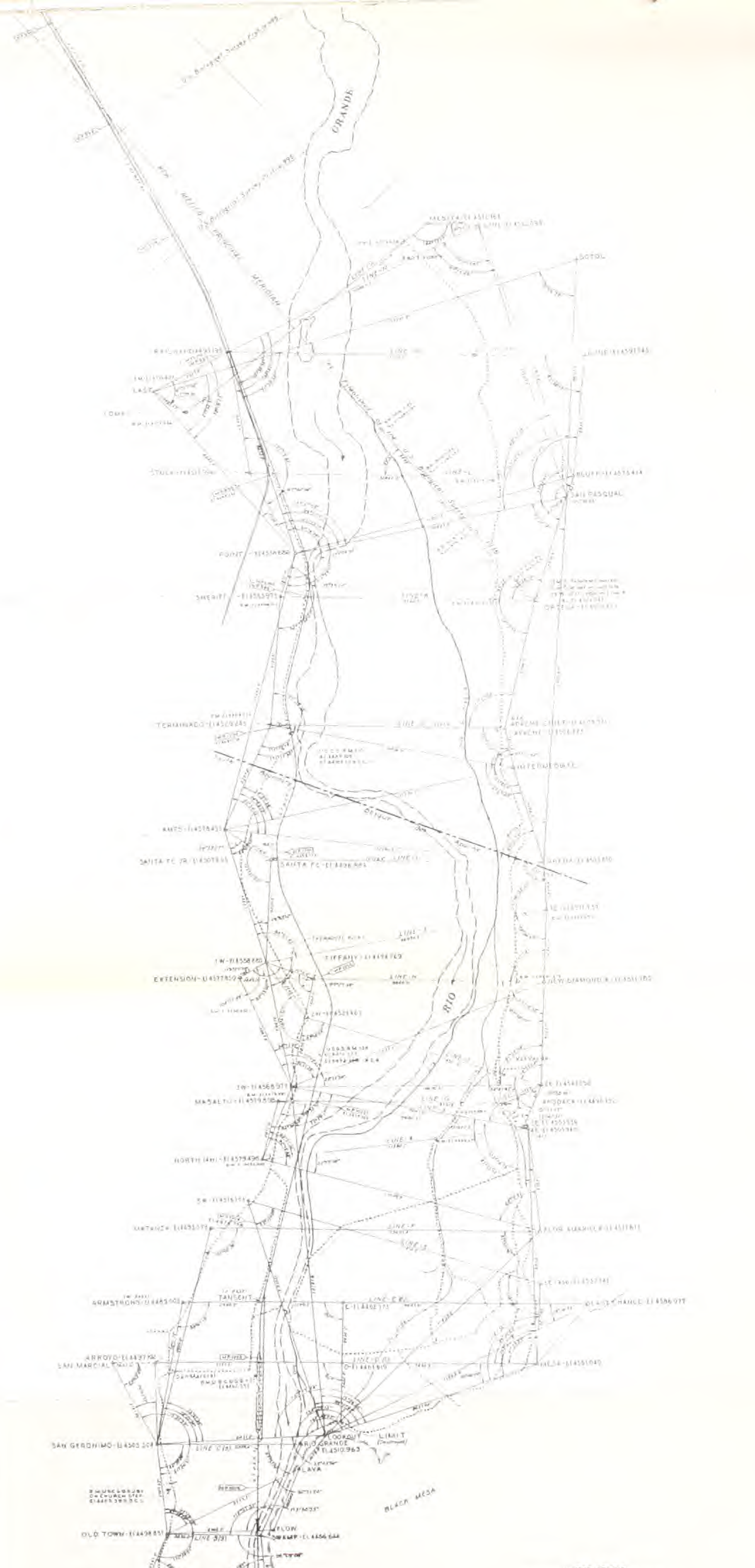
Scale: 1 Inch = 2000 Feet

2000 1000 0 2000 4000 6000 FEET

July-Dec. ····· 1936

H.W. Yeo, Engineer — Traced: R.D. Hanes

Note: Some B.M's on mile posts have been destroyed



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Scale: 1 Inch = 2000 Feet

July-Dec. 1936

H.W. Yeo, Engineer Traced R.D. Hanes

Note: Some B.M's on mile posts have been destroyed

MISCELLANEOUS PHOTOGRAPHS

Rio Grande Survey. Rio Grande. Looking across stream from Point of Land. Val Verde Mountain in background.

June 26, 1936

MISCELLANEOUS PHOTOGRAPHS

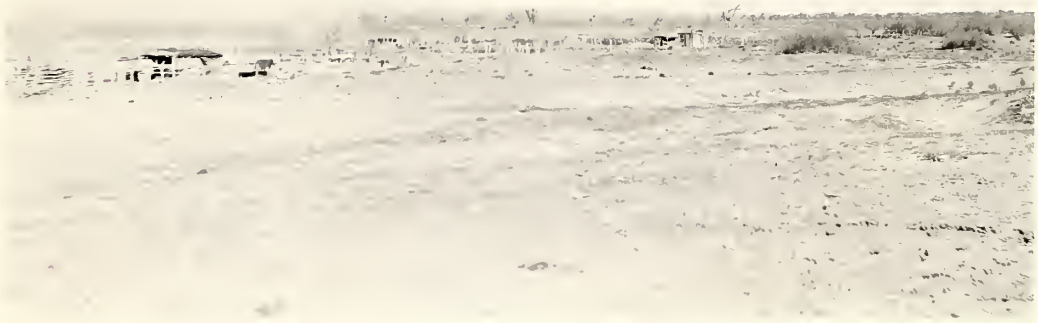
DECEMBER 12, 1936

NOTES ON MISCELLANEOUS PHOTOGRAPHS

OF DECEMBER 12, 1936

On December 12, several photographs were taken with the idea that they would be a record of the conditions which existed at that time, and that photographs would later be taken to show changes.

At several locations, later photographs have shown changes, especially the great changes resulting from the great floods of 1937.



Rio Grande Valley. Cross section line I. 415 feet westerly from triangulation station Arena and at Station 97+00. Looking westerly. December 12, 1936.

Rio Grande Valley. Cross section line. 415 feet westerly from triangulation station Arena and at Station 97+00. Looking northwesterly. Socorro Peak barely shows near the center. December 12, 1936.

Rio Grande Valley. Looking westerly from Station 71 + 50 on Line H. Magdalena Mountains in background.

December 12, 1936.

Rio Grande Valley. Cross section line G. Looking northwesterly from station 74+00 or from a point 61.3 feet westerly from triangulation station Apodaca. Magdalena Mountains in background.

Rio Grande Valley. Looking southeasterly along line D from station 15+00. Water surface elevation is 4459.75 feet.

Rio Grande Valley. Looking southeasterly from triangulation station Old Town along cross section Line B. Black Mesa at San Marcial in background. December 12, 1936.

Rio Grande Valley. Looking northeasterly from near triangulation station Old Town. Val Verde Mountains in the background and water tank of the A. T. & S. F. Railway Company at San Marcial near the center. December 12, 1936.

NOTES ON THE BRIDGE AT SAN MARCIAL

The road bridge northeasterly from San Marcial over the Rio Grande was raised about 6 feet during the summer or autumn of 1936, so when the floods of 1937 occured the bridge was above high water and was not injured by the floods.

See photographs of December 12, 1936, of December 1937, of April 25, 1937 and December 22, 1938.

MISCELLANEOUS PHOTOGRAPHS

APRIL 11, 1937

Rio Grande Valley. Bridge on road to Val Verde. Looking westerly on down stream side. December 12, 1936.

PHOTOGRAPHS OF APRIL 11, 1937

The following four photographs were secured to show the great deposition of materials which have accumulated at the mouth of the arroyo below Tranaquel Ruins and Tiffiny Triangulation Station.

The fill in places has been as great as fifteen feet since the cottonwood trees were young.

The Railway Company has spent considerable sums of money in recent years trying to protect their track, which has been overflowed several times at or near this location.

Rio Grande Valley. Cross section Line 1. Looking easterly from the edge of valley and showing deposit from Trenaquel Arroyo to the south and also the recently constructed dike of the A. T. & S. F. Railway. April 11, 1937

Rio Grande Valley. Cross section Line 1. Looking northerly along newly constructed dike shown in the preceding photo. Trees to left of truck are shown in following photo.

April 11, 1937.

Rio Grande Valley. Looking northerly and showing deposit of silt, sand, and gravel from Trenaquel Arroyo. A detail of a part of previous photo. Deposits are from 10 to 15 feet deep.

April 11, 1937.

San Marcial. Looking northerly from westerly culvert on road south of Line D. Elevation of water about 4461. Triangulation Station Masalto on point of land near right center. April 11, 1937.

MISCELLANEOUS PHOTOGRAPHS

APRIL 25, 1937.

Rio Grande Valley. Cross section Line E. Looking westerly from switch track. Water about 4462.0. feet in valley.

April 25, 1937.

Rio Grande Valley. San Marcial Area. Looking easterly from switch track of A. T. & S. F. Railway along Line E. April 25, 1937.

San Marcial. Looking southwesterly from switch track of A. T. & S. F. Railway along the San Marcial-Val Verde road. April 25, 1937.

San Marcial. Looking westerly along the south side of San Marcial - Val Verde bridge. Water about one foot lower than highest during season. April 25, 1937.

San Marcial. Looking northerly from westerly culvert on road south of Line D. Elevation of water about 4462. Triangulation Station Masalto on point of land near right center. April 25,1937

San Marcial. Former residence of division superintendent of the A. T. & S. F. Railroad. Photo April 25, 1937. Later on June 29 was 4.5 ft. higher or nearly 2.0 ft. deep above the first floor.

Rio Grande Valley. San Marcial Area. Cross section Line C. Looking westerly along line from track of A. T. & S. F. Railway. Part of line is on north side of alluvial cone below railway bridge. April 25, 1937.

San Marcial. Looking southerly along track from near Line C. Water on left side is 5.0 feet higher than on right side. April 25, 1937.

Rio Grande Valley. Old Town at San Marcial. Looking northerly and showing residence of Mr. Vivian on right. Taken April 25, 1937. Water was about half foot higher on April 29. High water approximately 4462 feet.

THE RAILWAY BRIDGE AT SAN MARCIAL

Several photos are shown of this bridge.

A photo taken on April 25, shows the water about an inch below the bridge. The photo on April 29, shows the water nearly a foot higher. A photo taken on may 31, shows the water to be lower than on April 29, but the discharge was much greater due to scouring. The photo of June 12, shows the river with the flood nearly gone

Rio Grande. Looking south along the west side of the railway bridge at San Marcial. Black Mesa is shown at extreme left. River can be seen for a mile and a half down stream. Water flowing under first span is flowing northwesterly.
April 25, 1937.

Rio Grande. Looking northwesterly from the west side of railway bridge at San Marcial. Water shown in photo is flowing northwesterly. April 25, 1937

Rio Grande. Looking northwesterly and showing a part of the south half of the bridge of the A. T. and S. F. Railway. Recorder shelter of International Boundary Commission's gage installed in February, 1932. Water about one tenth below bridge. April 25, 1937

Rio Grande Valley. Looking easterly along Line B from old highway. Water surface about 4462.0 feet. April 25, 1937

Albuquerque, New Mexico
April 26, 1937

MEMORANDUM

To: J. W. Jourdan

From: Herbert W. Yeo

Subject: Cursory Examination of Conditions at San Marcial

On Sunday, April 25, I went to San Marcial and while there made a partial examination of the conditions as they existed on that date. The following were noted:

Back water from the river was flowing over the causeway between San Geronimo and the railway track and it was estimated that about 100 second feet were flowing from the south side of a culvert through the causeway to the north side. Water was also flowing over the causeway in half a dozen places to a probable maximum depth of about .3 foot. When I returned to San Geronimo about 12:30 P. M., the water flowing over this causeway was about .1 foot deeper than at 9:30 A. M. This causeway is practically four feet above the general low part of the valley. A photograph was taken from the west culvert looking northerly.

I estimated the discharge of the Rio Grande under the highway bridge between San Marcial and Val Verde as being about 5000 second feet. The water had been considerably higher. A photograph was taken from the east side looking westerly a short distance below the railway crossing. The river was out of its banks and water was standing against the switch track of the railway. Just above where the highway crossed the switch track the Santa Fe Railway Company had been compelled to dump gravel on the east side of their track to keep the water from flowing over the track and destroying the same. It was estimated at this point the water on the east side of the railway was about 9 feet higher than the seepage water on the valley floor to the west.

I traversed the dike on the east side of the river northerly for a short distance and found no breaks in the same but I was told that there are eight breaks in this dike farther north and the water is pouring through the dikes and over the farm lands in the vidnity of Val Verde and La Mesa, and in some places the water on such lands is ten feet deep. Some of the adobe houses located at

the south end of the valley are disintegrating due to being surrounded by water. An effort was being made to secure a boat to move people from these houses on the east side of the valley to the west side of the river.

There were about 800 or 1,000 acres of land in cultivation on the east side of the river and practically all of this was under water. I was told one small tract still remains above water but there are several hundred acres of this land lower than the river and it will probably take more than a year for the water to evaporate provided the river does not change its channel. A photograph was taken looking westerly on Line E from the railway track and another photograph was taken looking southwesterly at the point where the San Marcial-Val Verde road crosses the switch track of the Santa Fe Railway.

I went to the railway bridge south of San Marcial and there found the water flowing against the lower part of the iron work on two spans and the clearance on the remaining spans varying from one to two-tenths foot. I estimated the discharge at 7,000 or 8,000 second feet and 1,000 second feet of this discharge was flowing up the valley instead of down the valley. Conditions are such that an alluvial cone is being built below the railway bridge on the lands containing brush and trees, and this cone evidently is building very rapidly as the quantity of water flowing northwesterly was very great. I estimated that 150 second feet were flowing along the north abutment of the railway bridge and flowing nearly parallel to the railway grade. This water which flows northwesterly from the railway bridge is what is causing the back water near the town of San Marcial more than a mile away.

Seepage water is now standing around the houses of the A. T. & S. F. Railway at San Marcial. After the flood of September 1929, the lower story of these company houses was filled with sand and arrangements were made for the occupancy of the upper story. The water now is within 18 inches of the floor of the upper story.

A photograph was taken from the railway track looking westerly on Line B.

I went to the Old Town, San Marcial, and there found the water very high and rising quite rapidly. It is not quite as high as during the flood of 1929 but was rising rapidly. The Gonzales store and Vivian residence were both surrounded by water but as they are of frame construction they may survive the effects of back water. A photograph was taken from the old highway looking east on Line B.

Governor Clyde Tingley of New Mexico was scheduled to hold a conference with the people of San Marcial at the school house at 2:30 P. M. on Sunday. The Governor's party which included a dozen or more automobiles was met on my return to Albuquerque while they were en route to San Marcial.

It is impossible to repair the breaks in the dike at the present time and whether the river will change its channel is problematical.

Herbert W. Yeo
Associate Agricultural Engineer

Corrected January 14, 1938

C O P Y

Albuquerque, New Mexico
April 27, 1937

MEMORANDUM

For: Rio Grande Files

From: J. W. Jourdan

Subject: Conference on Present Flood of the Rio Grande in the Vicinity of San Marcial, New Mexico.

Copy to: Messrs. E. R. Smith, Matthews, and Yeo.

Early in the afternoon of April 26, Dr. E. H. Wells, President of the New Mexico School of Mines, telephoned to Mr. Yeo from Santa Fe and asked for a conference to discuss conditions in the vicinity of San Marcial resulting from the present flood stage of the Rio Grande. Dr. Wells had been in conference with Governor Clyde Tingley and was requested to make a report to the Governor. He and the Governor and a large party had been on the scene of the flood on April 25. We assured Dr. Wells that we should be glad to meet him in Albuquerque and he drove down from Santa Fe, arriving at the office about 4:30 P.M.

General conditions existing at San Marcial were discussed and Mr. Yeo was able to give first hand information based upon his observations on the ground on April 25. Certain data gathered during the past two years by the Rio Grande District and presented in the form of graphs and charts were discussed and explained in some detail to Dr. Wells. A rise in the bed of the river near San Marcial during the period 1895-1936 and amounting to twelve feet was shown on the graph. From 1918 to 1936 the rise in river bed amounted to five feet. The profiles on the axis of the Elephant Butte Reservoir were shown for the years 1904 and 1908 of the first surveys, and for 1935 of the last survey. The thickness of deposition of silt in the Elephant Butte Reservoir varies greatly, being most at half way between San Marcial and the dam.

The area of farm lands threatened with total loss and at the present time inundated amounts to 1200 to 1500 acres and there seems little prospect of economically protecting these areas by means of larger dikes or of draining the land which is badly seeped. The question came up but no statements were made as to the probable value of the land.

COPY

Albuquerque, New Mexico
April 27, 1937

MEMORANDUM

For: Rio Grande Files

From: L. M. Jourdan

Subject: Conference on Present Flood of the Rio Grande in the Vicinity of San Marcial, New Mexico.

Copy to: Messrs. R. R. Smith, Matthews, and Yeo.

Early in the afternoon of April 26, Dr. B. H. Wells, President of the New Mexico School of Mines, telephoned to Mr. Yeo from Santa Fe and asked for a conference to discuss conditions in the vicinity of San Marcial resulting from the present flood stage of the Rio Grande. Dr. Wells had been in conference with Governor Clyde Tingley and was requested to make a report to the Governor. He and the Governor and a large party had been on the scene of the flood on April 25. We assured Dr. Wells that we should be glad to meet him in Albuquerque and he drove down from Santa Fe, arriving at the office about 4:30 P.M.

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The purpose of the conference was to present facts based on surveys and personal observations; discussion of the cause and effect of conditions was kept on an informal basis and not subject to quotation on the outside. Dr. Wells made notes of salient features discussed and any conclusions he draws and submits to the Governor will be his own. The data he received from the Soil Conservation Service as stated above were merely presentations of physical conditions and changes which have taken place in the river bed and adjacent valley lands during the period of eight years before the reservoir was completed in 1916 and the year 1936. I got in touch with Mr. Matthews and he was present during the latter part of the conference.

Dr. Wells in discussing the general conditions that contribute to floods and silting of reservoirs and channels in the Rio Grande basin showed a very good grasp of the subject and he appreciates the necessity and the value of control of the range and the installation of works at the headwaters. The policy of the Soil Conservation Service in this respect was stated briefly by Mr. Matthews. Dr. Wells was given a copy of the topographic map of San Marcial and vicinity, and also a copy of Technical Bulletin No. 524, by Mr. Henry M. Eakin of the Soil Conservation Service, on the silting of reservoirs.

Attached hereto is a report of April 26 of Mr. Yeo's examination of conditions at San Marcial the day before. The substance of Mr. Yeo's report was brought out during the meeting.

J. W. Jourdan
Chief Engineer
Rio Grande District

JWJ:EA
attach.

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Attached hereto is a report of April 26 of Mr. Yeo's examination of conditions at San Marcial the day before. The substance of Mr. Yeo's report was brought out during the meeting.

J. R. Lourdes
Chief Engineer
Rio Grande District

JRL:DA
attach.

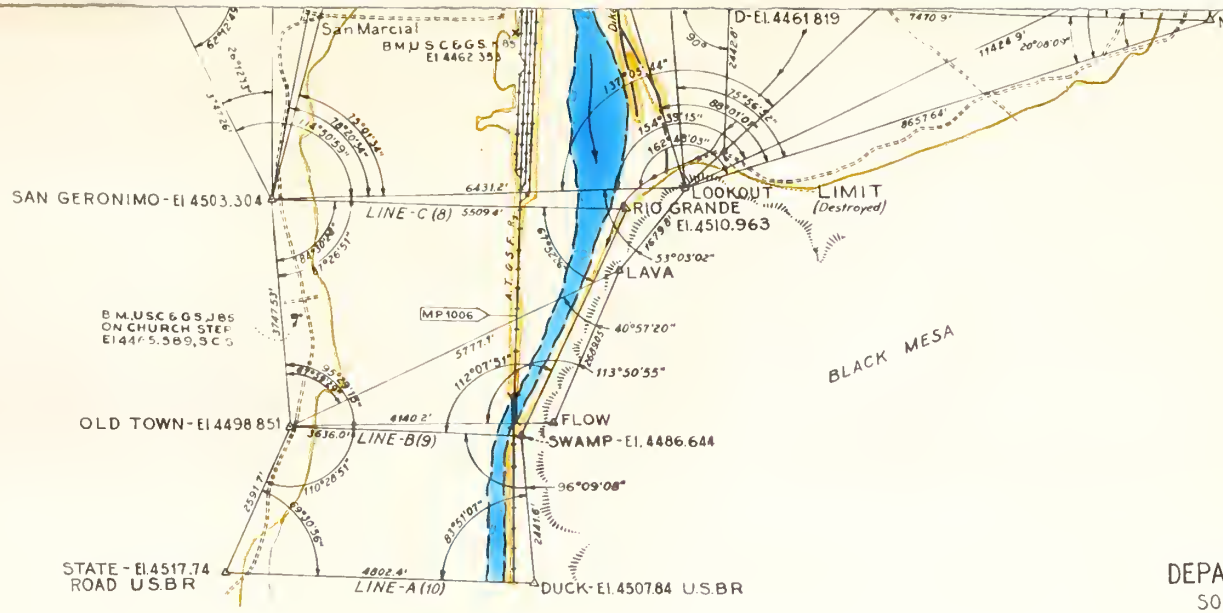
KEY MAP OF

SAN MARCIAL AND VICINITY

WITH HIGH WATER LINES

FROM APRIL 28 TO MAY 7, 1937

SHOWN THEREON



LEGEND

Flood of April 28, to May 7, 1937 inclusive

High water lines from the, Rio Grande

Seepage water

UNITED STATES
DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
RIO GRANDE DISTRICT
RIO GRANDE SURVEY

KEY MAP
OF
SAN MARCIAL & VICINITY

U.S. Bureau of Reclamation &
Hydrodynamics Section Cooperating

Scale: 1 Inch=2000 Feet

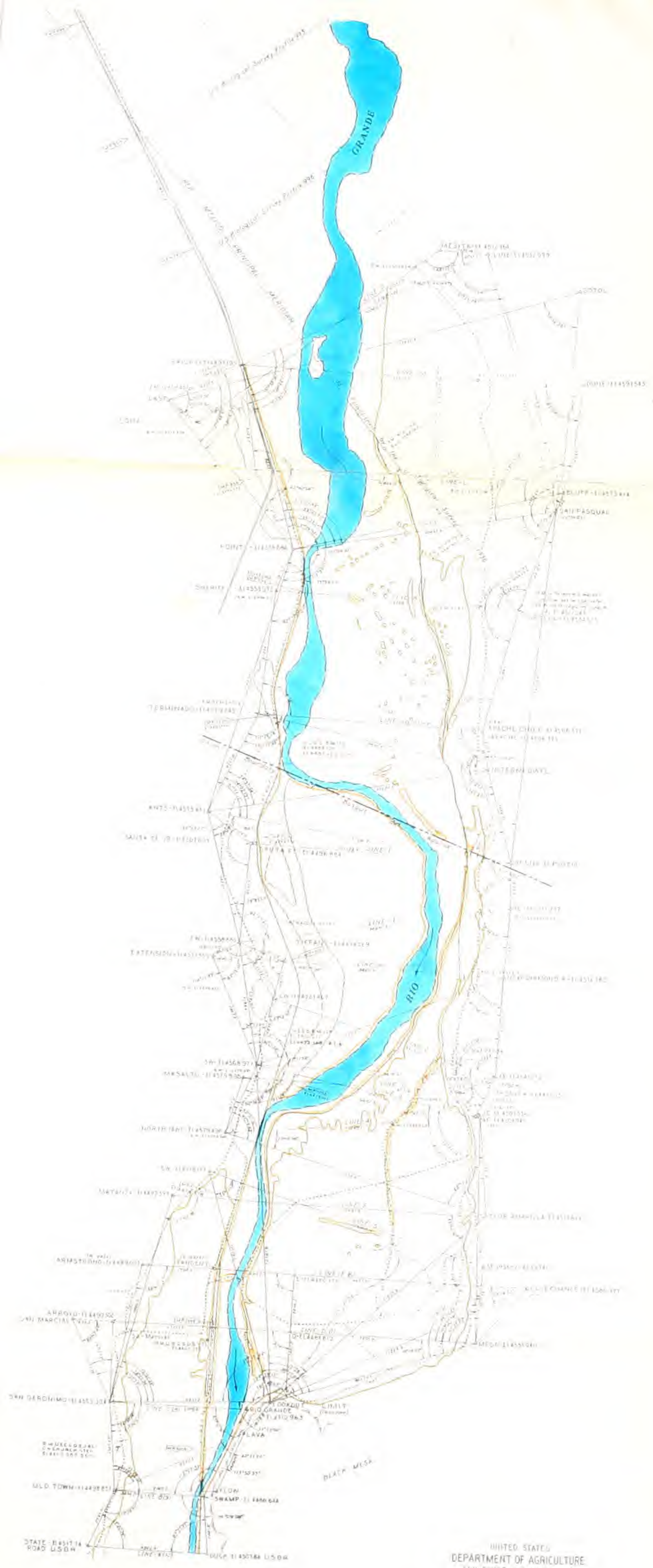
2000 1000 0 2000 4000 6000 FEET

July-Dec. 1936

H.W. Yeo, Engineer

Traced: R.D. Hanes

Note: Some B.M's on mile posts have been destroyed



LEGEND

Flood of April 28, to May 7, 1937 inclusive

High water lines from the, Rio Grande

Seepage water

UNITED STATES
DEPARTMENT OF AGRICULTURE
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RIO GRANDE DISTRICT
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KEY MAP

SAN MARCIAL & VICINITY

U.S. Bureau of Reclamation &
Hydrodynamics Section Cooperating

Scale 1 inch = 2000 Feet

July Dec — 1936

H.W. Yeo, Engineer — Traced R.D. Hahey

Note: Some B.M.'s on mile posts have been destroyed

C
O
P
Y

Rio Grande District
Albuquerque, New Mexico
April 30, 1937

PRELIMINARY REPORT ON INVESTIGATION OF CONDITIONS IN THE VICINITY OF VAL VERDE AND SAN MARCIAL ON APRIL 28, and 29, 1937

On the morning of April 28th, in company with Mr. Eaton of the Regional Office, I left Albuquerque at 7:00 and arrived at San Pedro about 10:00 A. M., having taken some water samples in route. From San Pedro, we proceeded down the valley on the east side, passing through Quadalajara. The road was in bad condition in many places due to wind blown sand but we were able to get through with only two short delays and it probably would have been impossible to get through if we had not had wide tires on the pick-up. We arrived a short time before noon at Val Verde.

A photograph was taken looking west on Line H. Breaks in the east branch of the Val Verde canal was noticed a short distance below this line and these breaks were caused by water flowing in from above and pocketing and then overflowing the canal and breaching the same. The height that the water reached at this place could not be determined but later an investigation was made in the vicinity of Linel and it was found that the water on that line had attained an elevation of approximately 4478.6, but there was no standing water on line 1 as the breaks near Line H had allowed the water to drain away from the place. It was also evident that the source of the running water from Linel must have been closed or the river had fallen so low that the break was no longer low enough to allow water to flow out of the river.

Mr. Eaton and I both took some photographs looking northerly from the point below Line H.

I took a photograph looking westerly on Line G. This line crosses a very small area adjacent to the foothills and southerly from Val Verde that has not been flooded due to the west branch of the Val Verde ditch protecting it from the northwest, and a small ditch protecting it on the south but, as water was about four feet higher to the northwest and about one foot higher to the south, seepage was evident and this area will probably be flooded by seepage. The water surface of the standing water south of Val Verde and easterly from the west branch of the Val Verde ditch was estimated to be about elevation 4468. This elevation would indicate that about 2500 acres were covered with standing water on the east side of the Rio Grande and south of Val Verde.

An attempt was made to drive southerly from Val Verde but it was found that this was nearly impossible and we went as far as the point of land about 1000 feet northwest of the Triangulation Station Flor Amarilla. Several photographs were taken from this point showing the conditions that prevailed at that time. We then returned to Val Verde and went down the west branch of the Val Verde ditch to a ditch which took out of the main canal about 300 feet northerly from a highway bridge over this west branch of the Val Verde ditch. We walked and waded out along this ditch for about 1000 feet towards the main river dike and I estimated that from 500 to 700 second feet were flowing through breaks in this canal. The topographic map shows a low place on the north side of this ditch.

Just before we began investigating this particular locality, two men had waded across from the river dike and that is the only way to get from the dike to Val Verde in this region. We then went up the main Val Verde ditch about 1000 feet above the Town of Val Verde and went westerly along a cross ditch and I estimated that 250 second feet were flowing through breaches in this ditch and that 200 second feet were coming in from the river through a break in the dike. It would, therefore, seem that the total flow in this vicinity was about 450 second feet, and that about one-half mile lower there was 500 or 700 second feet. Whether there is a break in the dike between the two sections could not be learned. We took some photographs in this vicinity and then proceeded to Socorro where we remained all night.

On the morning of the 29th, we left Socorro at 6:00 and first went to old town of San Marcial and there found that a store of Mr. Gonzales and the residence of Mr. Vivian were surrounded by water, and that the water had been nearly as high as during the flood of 1929. A few photographs were taken in this vicinity. We then came back to the causeway leading from the foothills to the railroad at San Marcial. The water in this causeway was practically one foot deeper than on Sunday, April 25. The elevation of the water surface here was not determined but it was estimated to be about 4462.

We waded across to the railway and then went to the highway bridge and found that there was considerable less water in the river than on Sunday past. The water in the past had been high enough to run over the railway track a short distance above where the San Marcial-Val Verde highway crosses the railway but the water had fallen more than a foot lower than it was on Sunday at this point. The elevation of the water along here was not determined as bench marks and stakes were not available. We then walked southerly along the dike on the east side of the river and found a newly constructed dike near the river on the east side, but the materials in the first breach of this dike were so soft that it was deemed dangerous to wade across the breach so return was made to the forks of the new dike and the old dike, and an investigation was made along the old dike.

This was breached in fifteen or twenty places and all were waded but the last two which it was believed to be dangerous to wade. I estimated that 1000 second feet were flowing through the breached dike toward the river. The discharge of 1000 second foot through this dike seems reasonable as there is probably 500 to 700 second feet flowing into the lake and the lake must have an area of 2500 acres. Small breaches were noted in the dike between the bridge and the forks of the old and new dike but these breaches had been repaired by local people.

A trip was made to the railway bridge 1006-A and a very unexpected condition was found below that bridge. The water surface in the river just below the bridge was about 0.3 feet higher than on Sunday, even though the discharge of the river was less and even though more water was flowing northerly around the north abutment of the bridge. It was estimated that 1000 second feet or more were flowing northwesterly was proportionately about the same as on Sunday last.

It is recommended that a survey party be sent into this area next week and that levels be run to determine the high water surface elevations at the following places: On the west side of the valley from one-half mile below Triangulation Station Old Town northerly to Line 5; on the east and west sides of the railway from Line 3 southerly to the railway bridge; along the dike on the east side of the river, from Line 1 to the south end; on the east side of the valley from Line 1, southerly to Triangulation Station Flor Amarilla; along the west branch of the Val Verde ditch, from Val Verde southerly to Line 4 or to Line F if possible.

The economic situation in the areas mentioned above is a serious one as practically the entire community depends upon the crops which are produced in the area. It is possible that the breaks in the dikes might be repaired and 200 or 300 acres planted to corn later in the season but there will be 1000 acres or more of land that cannot be cultivated during the present year. The Governor of the state has promised work for the people of the community on highways, but this will be very inconvenient and the men who get work on the highways would be compelled to leave their families where they are at the present time.

Getting in and out of Val Verde is very inconvenient and getting in or out of some of the parts of La Mesa is very much more inconvenient as there are no direct roads passable. To go from the south part of La Mesa to Val Verde necessitates going on a road easterly to the windmill of the Diamond A. Ranch, thence northerly over the mesa to a road that bears southwesterly to Val Verde, and then out along the valley to San Pedro over a road that bears southwesterly to Val Verde and then out along the valley to San Pedro over a road that is almost impassable for automobiles.

Herbert W. Yeo
Associate Agricultural Engineer

HWY:EA

SKETCH MAP

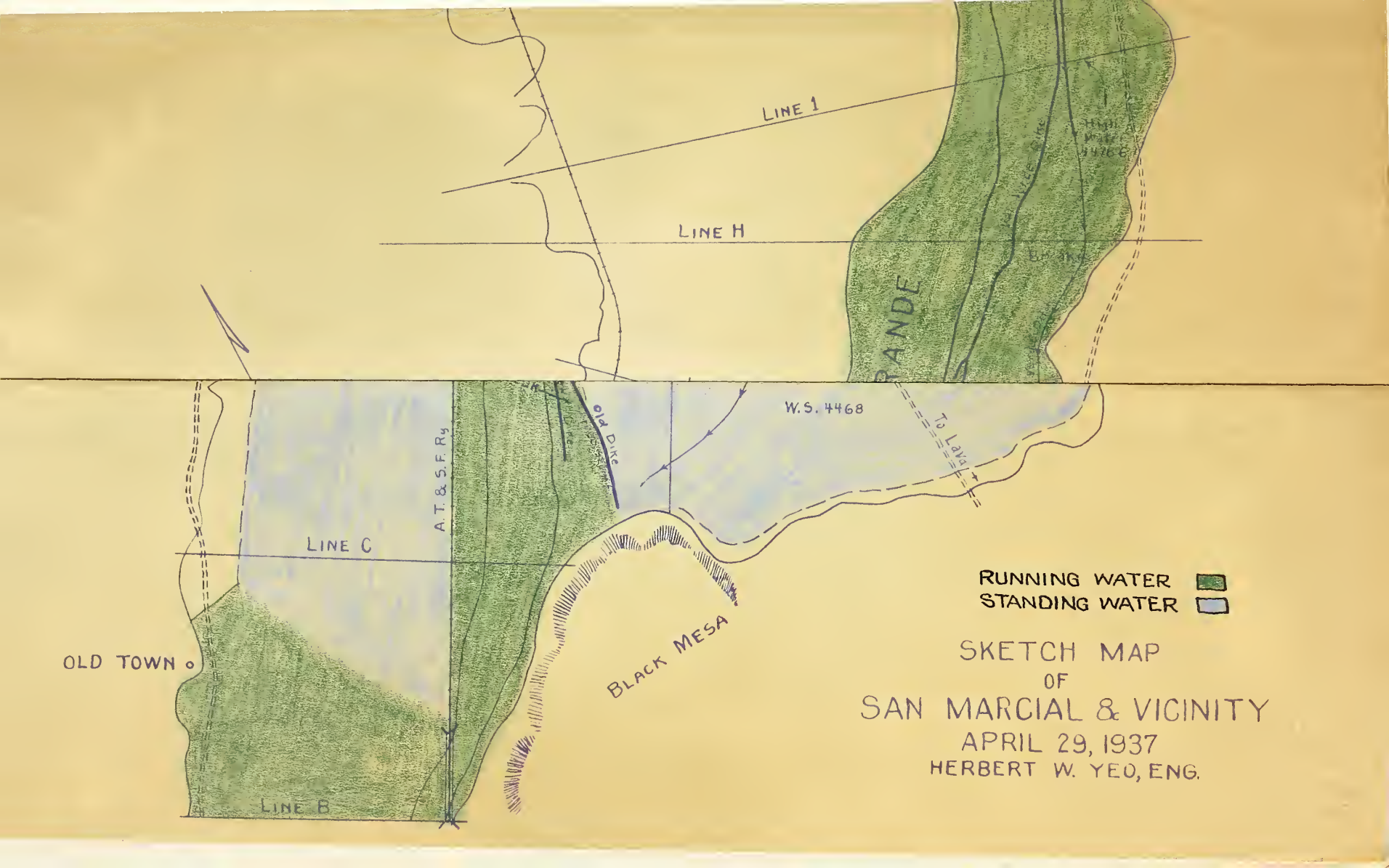
OF

SAN MARCIAL AND VICINITY

SHOWING

RUNNING & STANDING WATER

APRIL 29, 1937


LINE 1
LINE H
PANDE
W.S. 4468
To Lava
Old Dike
A.T. & S.F. Ry
LINE C
LINE B
OLD TOWN
BLACK MESA
RUNNING WATER
STANDING WATER
SKETCH MAP
OF
SAN MARCIAL & VICINITY
APRIL 29, 1937
HERBERT W. YEO, ENG.


LINE 1
LINE H
LINE 2
LINE G
LINE 4
LINE F
LINE 5
LINE E
LINE DE
LINE D
LINE C
LINE B
RIO GRANDE
VAL VERDE
MAGNETIC NORTH
FOOT OF MESA
W.S. 4475
250 SEC. FT.
200 SEC. FT.
500 SEC. FT.
Running W.S.
4468
W.S. 4460±
Backwater 4462
U.S. Hi-way 85
SAN MARCIAL
OLD TOWN
A.T. & S.F. Ry.
Old Dike
La Mesa School
W.S. 4468
To Lava
BLACK MESA
RUNNING WATER
STANDING WATER
SKETCH MAP
OF
SAN MARCIAL & VICINITY
APRIL 29, 1937
HERBERT W. YEO, ENG.

PHOTOGRAPHS BY

HERBERT W. YEO AND E. D. EATON

APRIL 28 AND 29, 1937

Rio Grande Valley. Looking northerly and showing break in Val Verde ditch due to pocketing of water which flowed from above Olguin Ranch. Line H crosses near tree on left side of ditch. About 200 second feet flowing through breaks. April 28, 1937.

Rio Grande Valley. Cross section Line H. Looking westerly from near elevation of 4480 feet. Tree near center is on west side of Val Verde ditch. Water had been 2.5 feet higher than shown due to pocketing.

Rio Grande Valley. Looking northeast from valley and between Lines 2 and H. E. D. Eaton in foreground. April 28, 1937.

Rio Grande Valley. Cross section Line G. Looking westerly from stake marked 55+00. Water surface 4471.5 feet in elevation. April 28,1937

Rio Grande Valley. Cross Section Line G. Looking westerly from a point 75 feet westerly from triangulation station Apodaca. Valley area not flooded near center, flooded area beyond. April 28,1937

Rio Grande Valley. Looking westerly from a point of land about 1000 feet northwesterly from Triangulation Station Flor Amarilla. Jacal shows near center. Water surface about 4468 feet.

April 28, 1937

Rio Grande Valley. Looking northwesterly from a point of land about 1000 feet northwesterly from Triangulation Station Flor Amarilla. Road from the south is between fences in the center.

April 28, 1937

San Marcial. Old Town. Looking southwesterly and showing Gonzales store near center. April 29, 1937.

Rio Grande. San Marcial. North half of Railway brodge. Water about half foot deep on lowest girder.

April 29, 1937.

Rio Grande. San Marcial. Looking northwesterly and showing a part of the south half of the bridge of the A. T. & S. F. Railway. Water about half foot higher than April 25, 1937.

April 29, 1937.

PHOTOGRAPHS

TAKEN MAY 4, 1937

BY

E. D. EATON

AT OR NEAR

SAN MARCIAL AND VAL VERDE

Work crews engaged in raising the railroad track to counteract the effects of lateral overflow. Near mile 997. Looking southeast.

High water below Elmendorf. Between Point of Land and mile 997 on railway. Shows a work train engaged in raising the fill and track. Silt bars exposed by receding water are visible in the upper center. Looking upstream from Point of Land.

Looking down the Rio Grande. Water flowing through Tiffany Ranch in right foreground. Val Verde extreme left foreground. Still and partly clear water near Val Verde. Fra Cristobal Mountains left background. A. T. & S. F. Ry. at right.

Flooded area north of Val Verde showing large breaks in the dike. The water area in the foreground is the river itself. Looking northeast.

North end of flooded area near Val Verde, looking downstream. Showing the agricultural land under water and the silt bars in the river being exposed by receding waters.

Flooded area near Val Verde. Showing flood water entering through breaks in the dike. Looking east.

Central portion of inundated area at Val Verde. Looking south from directly above the town.

Flooded area south of Val Verde. Shows the high water flowing into the area through breaks in the dikes along the center of the picture. Looking northeast from just north of the highway bridge.

Inundated agricultural lands below Val Verde. Showing farm houses 1600 feet northerly from Triangulation Station Flor Amarilla.

Inundated bosque land on the Val Verde side of the river showing breaks in the dike through which flood waters are receding. The highway bridge may be seen in the center left of the picture. Looking upstream.

Inundated agricultural land and dwellings near La Mesa. Highway bridge in left background. Looking west.

Inundated agricultural land and dwellings between Val Verde and La Mesa. Looking westward.

Lower end of Val Verde Valley. Flowing water at upper right. Still water in foreground. La Mesa schoolhouse near center.

San Marcial Railway Station, section headquarters, and dwellings surrounded by water. Looking southeast from near San Marcial.

San Marcial Station, section headquarters, former roundhouse and dwellings surrounded by water. Looking southwest from near the highway bridge.

Inundated railroad section headquarters near San Marcial. Looking west from over the embankment. These section crew dwellings were flooded in 1929. The second stories until recently occupied are just above water.

Inundated area, showing a flooded highway, residence and railroad works. Looking east from directly over San Marcial.

Inundated agricultural land just south of Val Verde. Looking east from below the highway bridge.

San Marcial Station and inundated lands between the railway and the town of San Geronimo. Looking northwest.

General view of the river just north of the Black Mesa showing the inundated bosque land on the Val Verde side on the right half of the picture . Breaks in the dike through which flood waters are draining are visible on this side. The highway bridge is visible in the upper center of the picture. Looking north.

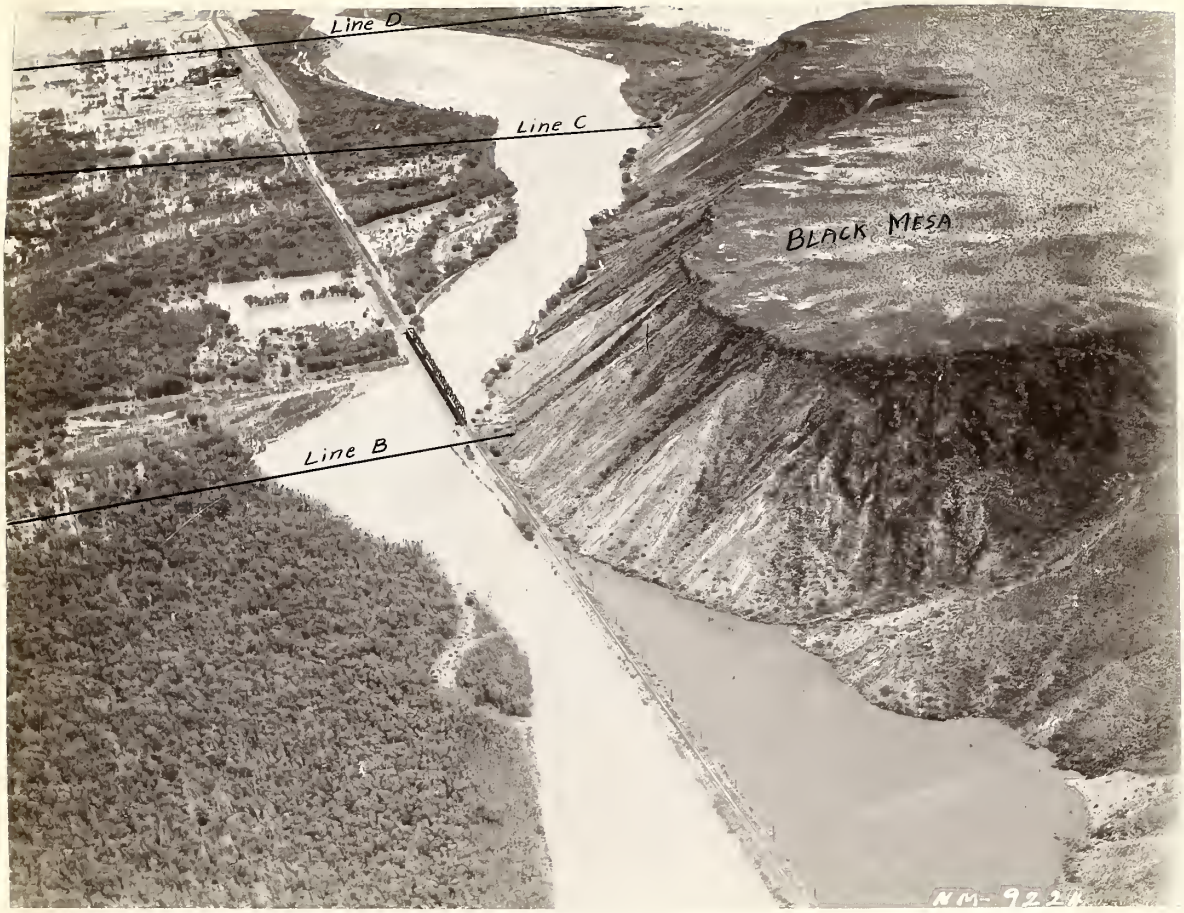
Dikes along the Val Verde side of the river showing breaks through which flood waters are pouring. Looking northeast from below the highway bridge.

Inundated area south of the San Marcial Station. Also silt bars in the river exposed by receding waters. General view of a portion of the Val Verde area in the background. Looking northeast from Old Town.

92-26

General view of the flooded area at Old San Marcial showing the inundated area between mesa and railroad. Looking west.

Railway bridge; showing alluvial cone formed just downstream from it. Backwater from the cone flowing towards San Marcial. Also shows general view of the Val Verde flooded area and silt bars in the river near the San Marcial Station being exposed by receding water. Looking upstream from just west of the Black Mesa.



Railway bridge showing the bend in the river and backwater from it flowing towards San Marcial. Looking upstream from south of the Black Mesa. Water in right foreground is seep water.

Bosque area on west side of river downstream from the railway bridge, looking northwest. Showing water running towards mesa on the left and from Old Town in right background.

Albuquerque, New Mexico

MEMORANDUM

To: Norbert E. Yeo

From: Glenn L. Anderson

Subject: Preliminary Report on Flood Conditions in the vicinity of San Marcial, New Mexico.

In accordance with your verbal instructions of May 3, I made a survey of flood conditions in the vicinity of San Marcial on May 5th to 8th. A preliminary report of this survey is herewith submitted.

Glenn L. Anderson.

PRELIMINARY REPORT ON CONDITIONS IN FLOODED AREA AT SAN MARCIAL - VAL VERDE DURING THE PERIOD MAY 5, 1937 TO MAY 8, 1937

During this period, elevations were taken at strategic points around and within the flooded area, especially along profile lines run in the survey of 1936, and along the A. T. & S. F. Railway.

On the west side of the valley, these elevations were taken as far north as Line 5. At this point the water elevation was 1464.2. This was back water and seepage. Elevations of the water surface were then taken southward to a point below Triangulation Station State Road. At this point the water elevation was 1461.9 a and there was a definite current flowing southward. A part of the road about 500 feet north of Old Town San Marcial was flooded. Many of the houses of Old Town were flooded and the water was at the foundations of the Catholic Church.

Over the causeway from San Marcial, (sometimes called San Geronimo), to the railway, the water on May 6 was about two feet deep and on May 8, it was about three feet deep. The house and buildings on the north side of the causeway were flooded and have been evacuated.

On May 5, the water was 0.20 foot above the U. S. C. and F. S. Bench mark, RB5. This bench mark is at an elevation 1462. 353 feet. On May 8, the water was 0.94 foot above the bench mark.

Elevations were taken May 6 at the edge of the river on Line 8, just below the railway bridge. The elevation of the water surface at this point was 1467.0. Elevations were then taken northward on the east and west sides along the railway. It was noticed that the water was flowing southward on the east side of the railway until it passed under the railway bridge and then it flowed northward toward San Marcial. The water was cutting in behind the north abutment of the railway bridge on the east side of the track, and this necessitated the dumping by the railway company of several car loads of rock to save the track.

At the point where Line 5 crosses the A. T. and S. F. Railway, the water elevation was 1470.2 on the east side of the tracks. Below this point approximately two miles, at Mile Post 1006, the water on the east side of the railway was 1467.6. The elevation of the center line of the A. T. & S. F. Railway at this point is about 1469.0.

Elevations were taken where Line D crosses the dike on the east side of the river. The water was at 4469.2 on the west and 4469.1 on the east. About 1400 ± feet south of Line D, there was a break in the dike through which several hundred second feet of water was flowing in a southwesterly direction to the river. North from the highway bridge along the dike, elevations were taken as far as Line 4. At station 11 + 26 on Line 4, the water was at an elevation of 4469.5.

Elevations were taken along the east side of the Rio Grande Valley north and south of Val Verde. At Station 93 + 20 on Line F which is about a mile and a half southerly from Val Verde the water elevation was 4469.3. Below this line are valuable farming lands which are covered by about six feet of water. There are many houses and also a school house in this area that are flooded. North of Val Verde elevations were taken at a point approximately two miles distant on Line I. The water here was at an elevation of 4479.0. North of this line approximately one-half mile is a small ditch, the south bank of which extends northward about a mile and a half. This was also valuable farming and grazing land. Only one house in this area was inundated.

The water on the west side of the main Val Verde canal at a point on Line E was at an elevation of 4471.9. Elevations were then taken southward, of the water on both the east and west sides of the canal as far as Line F where the elevation on the east side was 4469.4, and on the west, 4469.5. Below this point, the ditch banks had crumbled and broken and no attempt was made to go farther. These ditch banks were in a very weakened condition as far north as Line 3. Another series of breaks were seen in the ditch banks at and below where it is crossed by Line I. There are three breaks here with an estimated combined flow of about 900 second feet. This water was flowing northeast and east.

An inspection was also made of the dike along the river. I was unable to get farther than just below Line H at which point three large breaks occurred, through which I estimated from 1200 to 1500 second feet of water were flowing east and northeasterly. That part of the dike which I traversed was in a very weakened condition.

The main canal has been destroyed throughout a great deal of its length from Line I southward.

The people in this area have suffered considerable in the loss of their houses, farms and grazing lands, and the livestock that has been drowned.

On May 8th, I ran a profile of the Rio Grande on the downstream side of the San Marcial - Val Verde bridge. On this date the river was running approximately 7500 second feet. The river channel was

between stations 1 + 70 and 3 + 00, the distance being measured from the east end of the bridge. Between these points the water was running so swiftly that it was impossible to take any readings. I made an attempt to measure the water depth by tying a length of wire to a rock weighing 25 to 30 pounds. The force of the current carried this downstream so swiftly that the rock remained on top of the water.

The river was carrying the greatest amount of silt during this period on May 6th when the percentage by weight was 1.797. The river stage at the time the sample was taken was 7000 second feet.

This concluded the survey made of this area during this period.

Glenn L. Anderson
Assistant Engineering Aide

GLA:EB

RG

Albuquerque, New Mexico
May 17, 1937

MEMORANDUM

To: Herbert W. Yeo

From: M. A. Saxton

Subject: Stage of the Present Flood at San Marcial, New Mexico

On May 14, 1937, I visited San Marcial. The backwater on the west side of the railway track on that date stood at an elevation of 4464.2 feet, U. S. Coast and Geodetic Survey datum. Water extended continuously above Line 5 approximately two-thirds of the distance to Line 4. Northerly from this point only seepage pools were noted. The church in Old Town was crumbling at the foundation and was being dismantled and movable parts were being hauled away by truck. Private families from Old Town were also evacuating to Albuquerque, Socorro, and San Antonio.

The water was still rising; it stood higher than at any time during the flood of 1929. The inhabitants had been warned to expect a further rise during the 15th and 16th.

MAS:EA

M. A. Saxton

MISCELLANEOUS PHOTOGRAPHS

MAY 14, 1937

Rio Grande Valley. Line F. Looking easterly from Station 17 + 40.

Photo by Saxton. May 14, 1937

San Marcial. Line 5. Looking northeast from old road below 5 W.

Photo by Saxton. May 14, 1937

San Marcial. Looking northeasterly from triangulation station San Geronimo. Val Verde Mountains in left background and water works near center.
Photo by Saxton. May 14, 1937

San Marcial. Looking southerly along Old Town road.

Photo by Saxton. May 14, 1937

RG

Albuquerque, New Mexico
May 17, 1937

MEMORANDUM

To: J. W. Jourdan

From: Herbert W. Yeo

Subject: Preliminary Report on Investigation of San Marcial, New Mexico, May 16, 1937

An examination of Old Town San Marcial showed that about ten houses had fallen during the past two weeks. The water was standing within 0.5 foot of the top of the concrete foundation of the Catholic Church and waves had been high enough to wet the adobes on top of the concrete. No precautions had been taken to prevent the waves getting to the adobe bricks.

The water was rising on the morning of the 16th and the rise during the previous night had been about .04 foot. Water was standing in the residence of John Gienera who conducts a store between San Geronimo and Old Town. Several Photographs were taken which may show the conditions on this date. I went north of town to near Triangulation Station Masalto and then went southeasterly along the Old Camino Real to the right-of-way of the railway and was able to get on the track without getting in water. This was about one-quarter of a mile northerly from mile post 1004.

I noticed on Line 5 where it intersected the railway track that the water on the east side had been about 1.5 feet below the center of the track or had been to an approximate elevation of 4472.0. It was also noticed that the water in the past had been about .4 foot higher than when examined. At Line F which crosses at mile post 1004, high water appeared to be 1.5 feet lower than the center of the track or appears to have been at elevation 4471.6. Going southerly along the track, the high water on Line E was about elevation 4472.0. This appears to be a discrepancy in the elevation and this elevation is probably in error.

I noted that the Railway Company in the last three weeks have dumped from one to four feet of gravel on the east side of the track from near mile post 1004 to mile post 1006, and in places the water would have overflowed the track if the material had not been so deposited.

I secured two samples of water from the river and the water seemed to be fairly clear. The water had been higher near San Marcial than when I was there last and one of the railway employees told me that the highest water had been on Friday at 11:00 A.M. On Line D, the water appeared to have been .3 foot lower than the tracks which would make it at an elevation of 4464.7. Because of the back water being so close, the Railway Company had ceased running trains over their main line and were running trains over the switch track which was higher and to the east.

In some places in the vicinity of the Railway Station at San Marcial, water to the extent of a second foot was running across the track from the seepage through the embankment for the switch track. I noticed that the water flowing northerly from the railway bridge along the west side of the track had concentrated at the old dike on the south side of the old river bed, and that a telephone or telegraph pole had been washed out and that the Railway Company had dumped several carloads of gravel to protect the grade from washing at this place. I noticed that the gage at the gaging station of the International Boundary Commission was reading 3.48 at 10:00 A.M.

The water at the river was within about one-half foot of the top of the lower girders of the railway bridge and this is considerably higher than when I was there three weeks ago. It was my impression that there was twice as much water at the railway bridge as there was at the highway bridge. If this be true, then half of the water in the river must be flowing over the farm lands in the vicinity of Val Verde.

I noticed a peculiar condition on the upper side of the bridge. The surface water seemed to be comparatively clear yet boils which would bring sand and silt to near the surface occurred due to the obstruction of the bridge piers. This was something that I had never seen before at this site or any other place. It was evident that the deposition of silt below the railway bridge was causing a rise in the stream channel and water surface. A large percentage of the water flowing under the bridge was still flowing northwesterly towards San Marcial.

An investigation was made of the water surface on Line C and it was estimated that the elevation was 4464.0. An investigation was made on the line easterly from Triangulation Station Armstrong and it was estimated that the water was .45 foot higher than stake marking 12+00 which would make the elevation of the water surface at 4464.75. This agrees fairly well with the elevation near the Railway Station at San Marcial.

In general, the water at San Marcial is rising and the deposition of silt is causing a rise in the bed of the river below the railway bridge and in the adjacent bosque.

Herbert W. Yeo
Associate Agricultural Engineer

HWY:EA

MISCELLANEOUS PHOTOGRAPHS

MAY 16, 1937

Rio Grande Valley. Valley cross section. Line 997. Biological Survey.

May 16, 1937

Rio Grande Valley. Looking westerly from Railway track on Line F.

May 16, 1937.

San Marcial. Reflections in the water. Near Line 4.

May 16, 1937.

Rio Grande Valley. Line 5. Looking westerly from track of the A. T. & S. F. Railway toward 5 W.

May 16, 1937.

Rio Grande Valley. Line E. Looking westerly from switch track of Railway. Elevation of water about 4464.2.

May 16, 1937.

San Marcial. Houses of the A. T. & S. F. Railway. Elevation of water about 4464.2.

May 16, 1937.

San Marcial. Ruins of old Round House. Looking west from Railway track. Part of stock shipping yards in extreme right.

May 16, 1937.

San Marcial. Looking south along west side of bridge of the A. T. & S. F. Railway.

May 16, 1937.

San Marcial. North side of Catholic Church at Old Town. Water half foot below top of concrete.

May 16, 1937.

PHOTOGRAPHS

IN THE VICINITY OF SAN MARCIAL

BY

E. D. EATON

MAY 27, 1937

Looking northerly up the upper end of the Elephant Butte Reservoir and the Rio Grande Valley. The flooded area of San Marcial is to the left of the center and the return flow therefrom is in the right foreground. The Black Mesa and the flooded area near Val Verde are at the right. Thebridge of the A. T. & S. F. Railway and the San Marcial highway bridge are discernible. The channel prior to the avulsion of 1920 is shown by the vegetation near the center. May 27, 1937, by E. D. Eaton.

Looking northerly up the upper part of the Elephant Butte Reservoir and up the Rio Grande Valley. Flooded area near San Marcial and return flow therfrom along the west edge of the valley and reservoir. Upper end of reservoir near railway bridge. Black Mesa at right and flooded area at Val Verde beyond. Old channel prior to avulsion of 1920 shown by vegetation near center. May 27, 1937, by E. D. Eaton.

Looking westerly across part of upper end of Elephant Butte Reservoir about five miles below San Marcial. A. T. & S. F. Railway in foreground. Old Fort Craig near left edge and west of the river. Return flow from San Marcial is west of river and next to mesa. Overflow from river below railway bridge on east side of river. May 27, 1937, by E. D. Eaton.

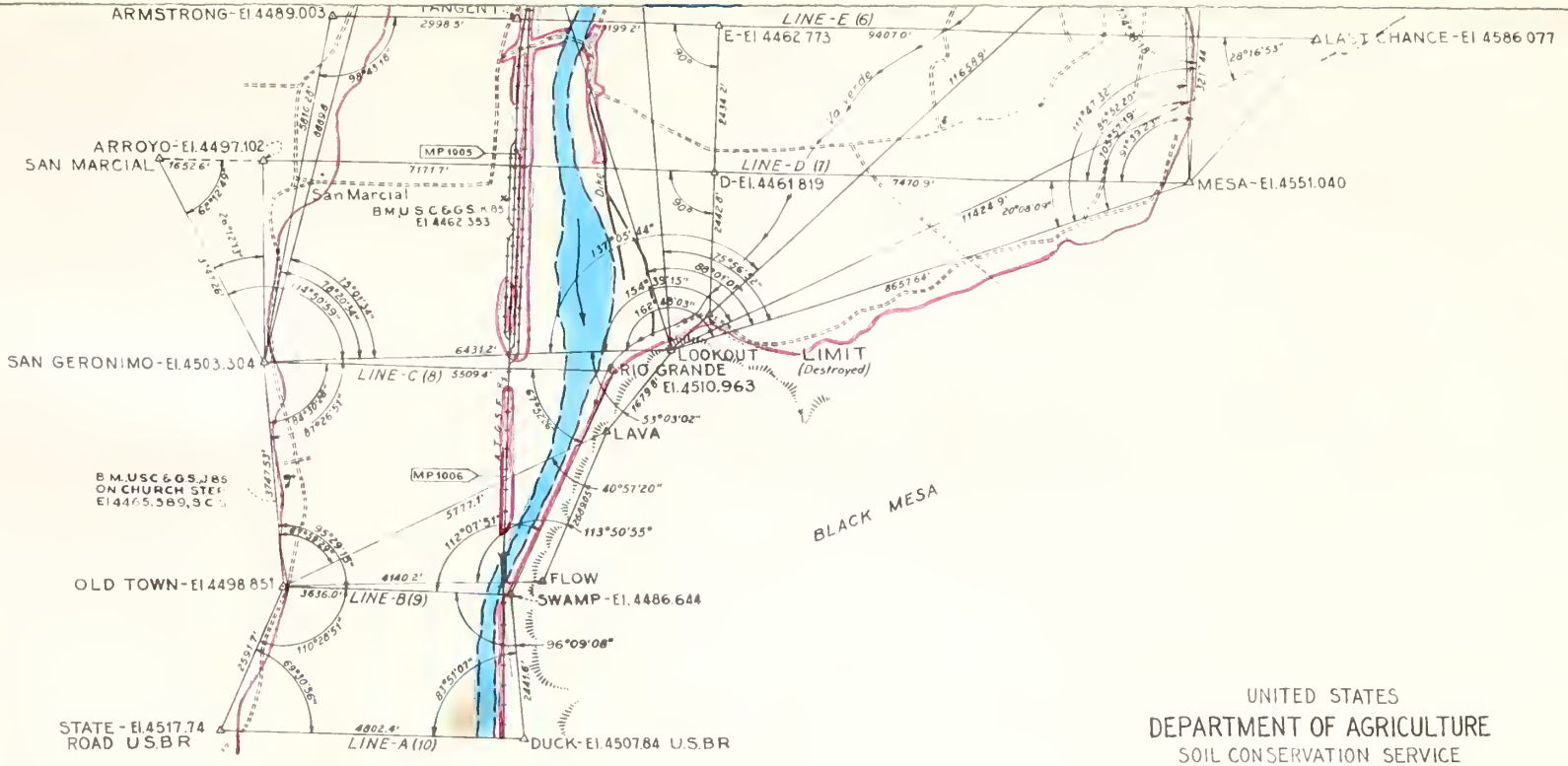
KEY MAP OF

SAN MARCIAL AND VICINITY

WITH HIGH WATER LINES

MAY 29, 1937

SHOWN THEREON



LEGEND

Flood May 29, 1937

High Water lines, Rio Grande

High Water lines, Arroyos

UNITED STATES

DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

RIO GRANDE DISTRICT

RIO GRANDE SURVEY

KEY MAP

OF

SAN MARCIAL & VICINITY

U.S. Bureau of Reclamation &
Hydrodynamics Section Cooperating

Scale: 1 Inch = 2000 Feet

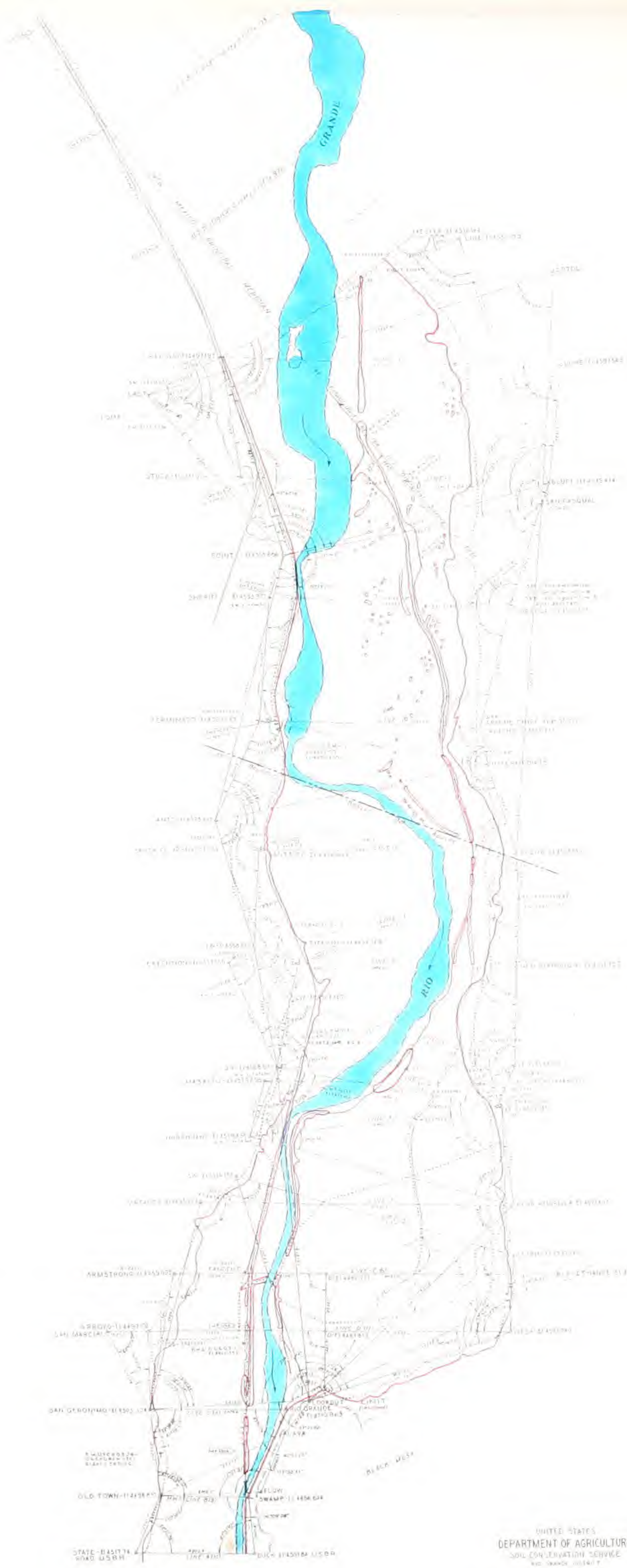
2000 1000 0 2000 4000 6000 FEET

July-Dec. 1936

H.W. Yeo, Engineer

Traced: R.D. Hanes

Note: Some B.M's on mile posts have been destroyed



LEGEND
Flood May 29, 1937
High water lines, Rio Grande
High Water lines, Arroyos

UNITED STATES
DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
RIO GRANDE PROJECT
RIO GRANDE SURVEY

KEY MAP
to
SAN MARCIAL & VICINITY

U.S. Bureau of Reclamation &
Hydrodynamick Section Cooperating
Scale 1 inch = 2000 Feet

July-Dec 1936

H.W. Yeo, Engineer Traced R.D. Flanes

Faults: Some, 8 Mls. on mile posts have been destroyed


U.S. DEPARTMENT OF AGRICULTURE
NATIONAL AGRICULTURAL LIBRARY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